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On the revisited types of four poorly known African species of *Palpimanus* (Araneae, Palpimanidae)

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Abstract

Based on the types deposited in the Museum für Naturkunde Berlin (Germany), the following African species of *Palpimanus* Dufour, 1820 are re-examined and redescribed in details: *P. namaquensis* Simon, 1910 (South Africa, Namibia), *P. nubilus* Simon, 1910 (Namibia), *P. paroculus* Simon, 1910 (South Africa, Namibia) and *P. processiger* Strand, 1913 (Rwanda). The distribution of the considered species is specified and the erroneously interpreted geographical data, previously presented in the World Spider Catalog (2019), are corrected.

Keywords

Aranei, spiders, taxonomy, Namibia, Rwanda, South Africa

Introduction

The Palpimanidae is a rather small spider family with only 150 named species assigned to 18 genera (WSC 2019). *Palpimanus* Dufour, 1820 is the type and second largest genus in the family, with 36 species currently known from the West Palearctic, Africa and South America (*Op. cit.*). *Palpimanus* has never been subjected to a thorough revision, with only the Mediterranean species having been surveyed in Kulczyński (1909), Platnick (1981) and Hernández-Corral and Ferrández (2017). Half of the currently accepted *Palpimanus* spp. are known either from females (10) or males (7) only or even from juveniles (1).

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None of illustrations showing the female characters in *Palpimanus* presents a detailed figure of the endogyne. Eight species were described without any accompanying illustrations and figures of the male palp were not provided for the majority of the congeners.

To date, 21 species of *Palpimanus* are known to occur in Africa, south of the Sahara and none of them has been revised. To fill these gaps, we have commenced a step-by-step redescription of all the available types in order to assist in a future revision of the genus. We have recently obtained the types of four species of *Palpimanus*, housed in the Museum für Naturkunde Berlin (Germany). The data provided by WSC (2019), that the Muséum national d'Histoire naturelle (Paris, France) is an assumed depository for most of them, should thus be corrected. Their detailed redescriptions are provided below.

Material and methods

Depositories:

MNB Museum für Naturkunde, Berlin, Germany;
MNHN Muséum national d'Histoire naturelle, Paris, France.

Photographs were taken in dishes of various sizes with a plastic lining on the bottom. Specimens were photographed using a Canon EOS 7D camera attached to an Olympus SZX16 stereomicroscope at the Zoological Museum, University of Turku, Finland. Digital images were processed using the "CombineZP" image stacking software (http://www.hadleyweb.pwp.blueyonder.co.uk/).

Illustrations of the female copulatory organs (see Figs 13–16 and 25–29) were made following maceration in a 20% potassium hydroxide aqueous solution and exposure for several minutes in an alcohol/water solution of Chlorazol Black. Leg segment lengths were measured on the dorsal side. All measurements are given in millimetres.

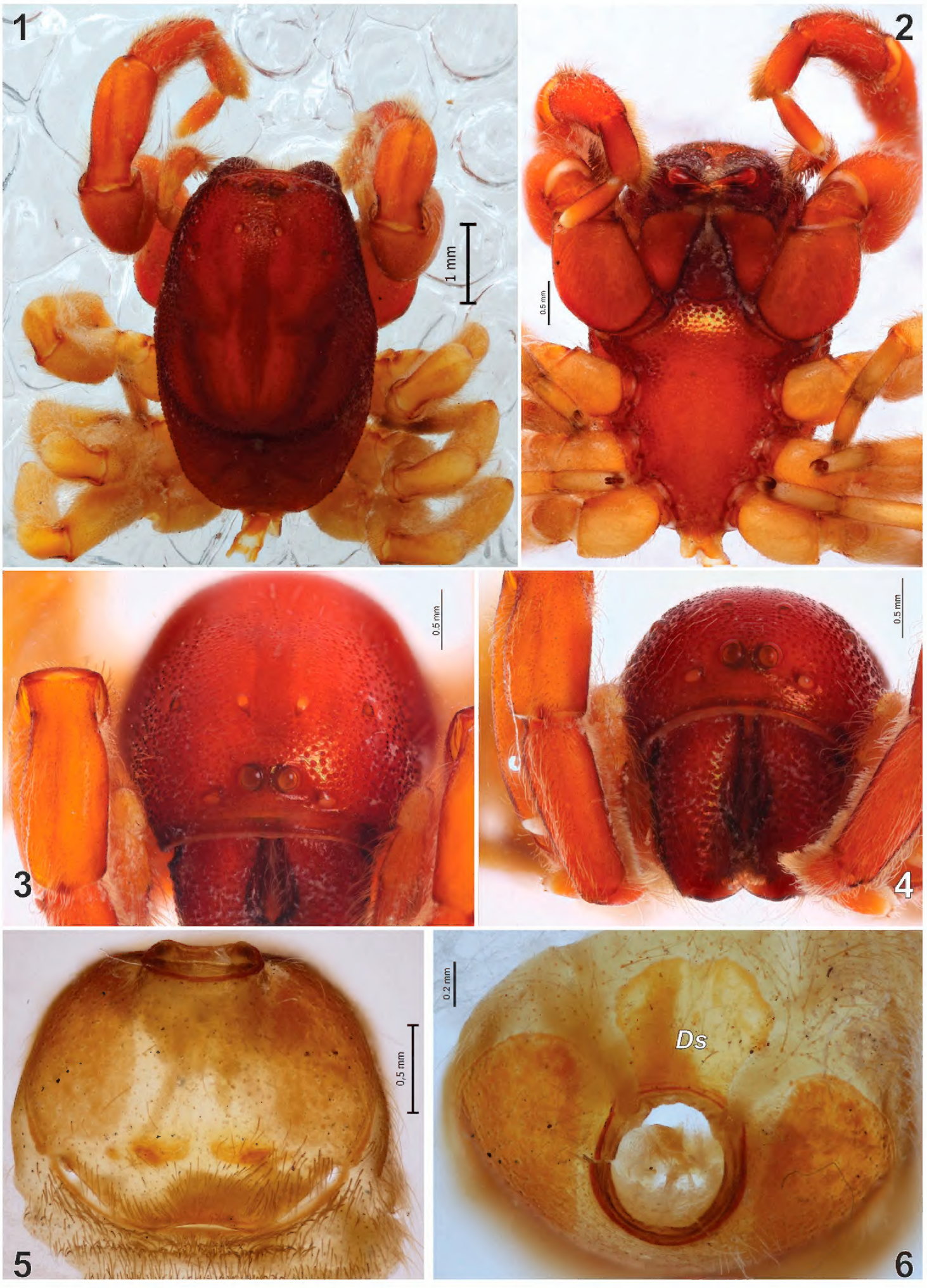
Abbreviations (except encoded in the text):

ALE anterior lateral eyes
AME anterior median eyes
CL carapace length
CW carapace width
CyH clypeus height
L/W ratio length/width
PLE posterior lateral eyes
PME posterior median eyes
PTC paired tarsal claws
TL total length of body in dorsal view

Results

***Palpimanus namaquensis* Simon, 1910**
Figs 1–6

Palpimanus namaquensis Simon, 1910: 178 (♂♀); Griffin and Dippenaar-Schoeman 1991: 158; Dippenaar-Schoeman and Van den Berg 2010: 75.



Figures 1–6. *Palpimanus namaquensis*, subadult female (syntype). **1, 2** Prosoma, dorsal and ventral view, respectively **3, 4** prosoma, dorso-anterior and anterior view, respectively **5** ventral abdominal scutum, ventral view **6** dorsal and ventral abdominal scuta, anterior view. Abbreviation: *Ds* dorsal scutum.

Redescription. Subadult female (syntype) MNB 13859.

Habitus (Figs 1–4). *Measurements*: TL ca. 9.0 (abdomen and petiole separated from prosoma), CL 4.36, CW 2.75, CyH 0.35 (0.25 margins), femur I L/W 1.87 (2.27/1.22). *Eyes*: AME 0.19, ALE 0.13, PLE 0.12, PME 0.10, AME–AME 0.13, AME–ALE 0.22, ALE–PLE 0.84, PLE–PME 0.53, PME–PME 0.40. *Colour in alcohol*: Carapace, chelicerae and labium medium cherry-red, sternum, maxillae, leg I entirely and abdominal scuta light yellowish-red, other legs pale yellowish-orange, unsclerotised part of abdomen pale yellowish-brown with few small dark brown marks on ventral side near spinnerets. Integument of carapace very moderately rugose on dorsal side of cephalic portion but more coarsely rugose laterally and in thoracic part, abdomen uniformly covered with dense fine microsetae mixed with less numerous longer and stouter setae. *Legs*: Leg formula 1423. Tibia I unarmed, but metatarsus I ventrally with ca. 15 small rod-like teeth. True undivided scopula on entire ventral surface of tibia I; long, entire and prolateral on metatarsus and tarsus I, widely divided by setae on tarsi II and III, vestigial on tarsus IV. Metatarsi II–IV with ventral brushes of dense setae. PTC each with 3–5 tiny low teeth.

Leg measurements:

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Palp	0.88	0.32	0.52	–	0.77	2.49
I	2.27	1.82	1.67	0.85	0.88	7.49
II	1.78	1.26	1.30	0.89	0.63	5.86
III	1.75	1.06	1.05	0.97	0.68	5.51
IV	2.22	1.38	1.57	1.37	0.88	7.42

Abdomen: abdominal scuta very transparent and weakly pigmented. Dorsal scutum (Ds) hexagonal, not fused with epigastral one, wider than long, spaced from epigastral scutum by 1/3 of maximal width; epigastral scutum with shallow concavity, postgastrum with one stripe-like scutum (Ps) fused with epigastral one near lateral margin of book-lung slit. Petiolar tube very short without transversal wrinkles. Whether the described structures entirely correspond to those of the conspecific adult females, or not, is currently uncertain.

Copulatory organs: undeveloped (Fig. 5).

Male. The current depository of the male syntype was not located (most probably, it was placed by Simon in the MNHN) and this specimen has thus not been examined.

Types. Syntypes ♀ subad., 2 juvs, SOUTH AFRICA: *Northern Cape Province*, Komaggas (original "Kammagas"; 29°48'S, 17°30'E), vii.1904, L. Schultze (MNB 13859). Syntype ♂, same data (MNHN, not examined).

Distribution. Known from South Africa (WSC 2019) and Namibia (Griffin & Dippenaar-Schoeman 1991).

Palpimanus nubilus Simon, 1910

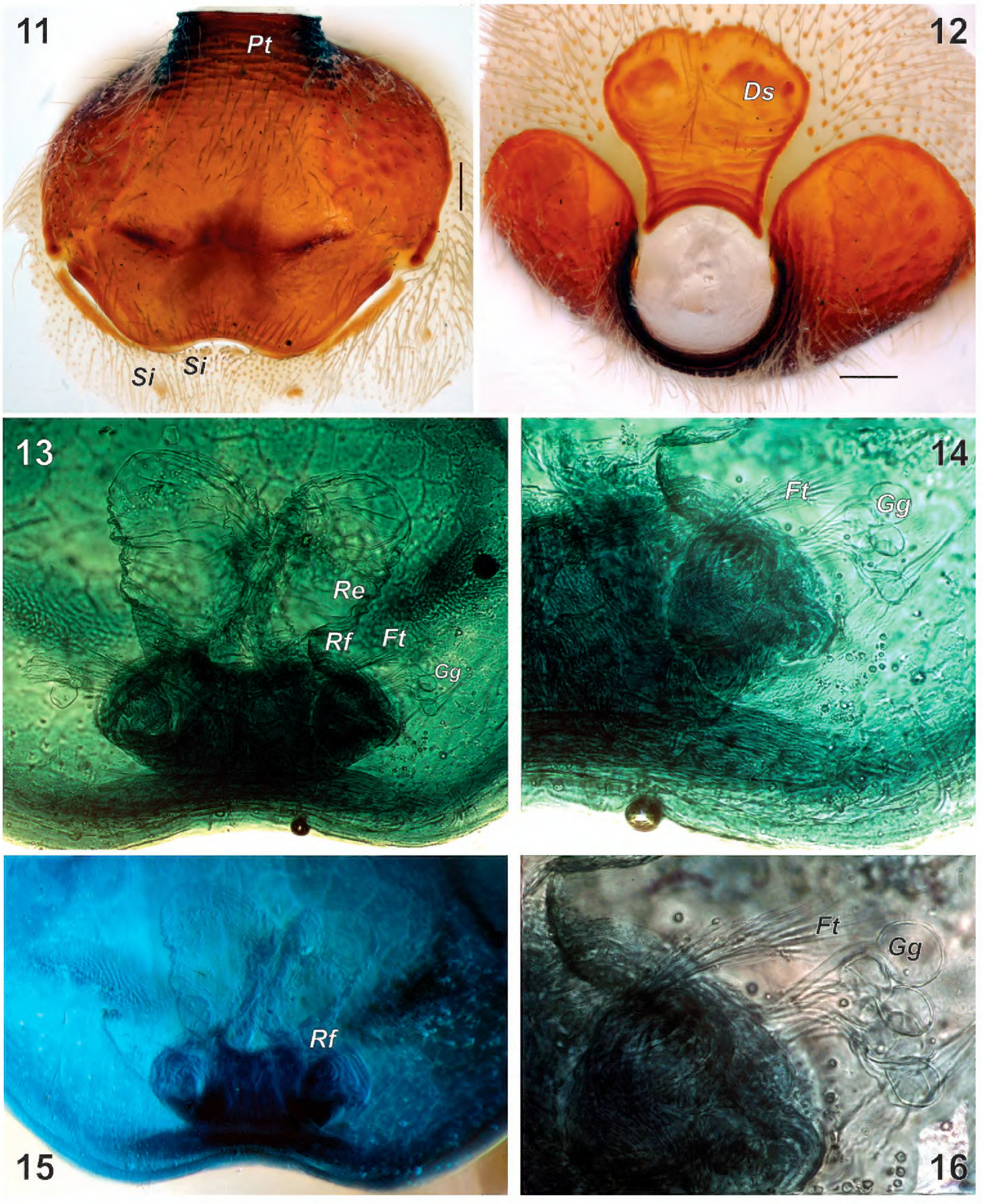
Figs 7–16

Palpimanus nubilus Simon, 1910: 179 (♀); Griffin and Dippenaar-Schoeman 1991: 158; Dippenaar-Schoeman and Van den Berg 2010: 75.

Figures 7–10. *Palpimanus nubilus*, female (holotype). **7** Prosoma and legs, dorsal view **8** prosoma, ventral view **9, 10** anterior part of prosoma, dorso-anterior and anterior view, respectively.

Redescription. Female (holotype) MNB 13860.

Habitus (Figs 7–10). Integument of carapace moderately rugose in cephalic portion and coarsely rugose in thoracic part, abdomen uniformly covered with dense fine microsetae. *Measurements*: TL ca. 7.20 (abdomen and petiole separated from prosoma), CL 3.36, CW 2.43, CyH 0.32 (0.25 margins), tibia I L/W 1.55 (2.09/1.35). *Eyes*: AME 0.16, ALE 0.11, PLE 0.09, PME 0.10, AME–AME 0.10, AME–ALE 0.11, ALE–PLE 0.55, PLE–PME 0.39, PME–PME 0.36. *Colour in alcohol*: Carapace and



Figures 11–16. *Palpimanus nubilus*, female (holotype). **11** Ventral scuta, ventral view **12** dorsal and epigastral scuta, anterior view **13, 15** endogyne, dorsal view **14, 16** right side of endogyne, close up, dorsal view. Scale bars: 0.2 mm (where indicated). Abbreviations: *Ds* dorsal scutum; *Gg* grape shaped gland; *Ft* fine threads; *Re* receptacle, *Rf* basolateral fold of endogyne.

chelicerae intense dark red, ventral prosoma and leg I segments from femur to metatarsus and abdominal scuta scarlet red, other leg segments yellowish-orange, unsclerotised part of abdomen pale yellowish-brown with few small dark brown marks on ventral side near spinnerets. *Legs*: formula 4123. Coxa I dorsally, patella and tibia I ventrally with numerous and dense small granules. Thin undivided scopula on entire ventral

and proventral surface of tibia I; very thin and prolateral on metatarsus and tarsus I, elsewhere absent. Palpal tarsus, metatarsi and tarsi II–IV with ventral brushes of dense setae. PTC each with 2–4 small teeth.

Leg measurements:

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Palp	0.75	0.26	0.48	–	0.57	2.06
I	2.09	1.73	1.44	0.61	0.60	6.47
II	1.70	1.17	1.26	0.79	0.53	5.45
III	1.56	0.98	1.09	0.90	0.52	5.05
IV	2.18	1.34	1.72	1.61	0.63	7.48

Abdomen: dorsal scutum (*Ds*) hexagonal (Fig. 12), not fused with postgastral one, as long as wide, closely separated with epigastral scutum basally. Epigastral scutum (Fig. 11) with distinct petiolar tube (*Pt*) covered with transversal wrinkles, concavity shallow and not wide; postgastral scutum not solid, represented by at least 3 pairs of separate scuta, stripe-like (*Ss*) along book-lung slit and 2 pairs of sigilla-like scuta (*Si*), one pair in concavity and one pair posteriorly.

Copulatory organs (Figs 13–16): endogyne with large membranous receptacles (*Re*) lacking pore glands; basolateral fold (*Rf*) distinct; 3 pairs of grape shape glands (*Gg*) on each side, stalks relatively short, pore glands absent; fine threads (*Ft*) distinct and short.

Male. Unknown.

Types. Holotype ♀, NAMIBIA: *Erongo Region* (no specific locality, only the south-eastern part of "Hereroland" or "Damaraland", located within the aforementioned recent region, is mentioned), ix.1904, L. Schultze (MNB 13860).

Distribution. Namibia. Erroneously listed as distributed exclusively in South Africa by WSC (2019).

Palpimanus paroculus Simon, 1910

Figs 17–29

Palpimanus paroculus Simon, 1910: 179 (♀); Griffin and Dippenaar-Schoeman 1991: 158.

Redescription. Female (lectotype) MNB 14211.

Habitus (Figs 17–22). Carapace and chelicerae moderately rugose, unsclerotised part of abdomen covered with dense fine microsetae mixed with less numerous longer and stouter setae. *Measurements*: TL ca. 7.00 (abdomen and petiole separated from prosoma), CL 3.32, CW 2.29, CyH 0.28 (0.23 margins), tibia I L/W 1.66 (2.19/1.32). *Eyes*: AME 0.13, ALE 0.11, PLE 0.09, PME 0.08, AME–AME 0.07, AME–ALE 0.06, ALE–PLE 0.61, PLE–PME 0.34, PME–PME 0.31. *Colour in alcohol*: Carapace and chelicerae carmine, ventral prosoma, palp and leg I segments from femur to metatarsus and abdominal scuta yellowish-red, other leg segments yellowish-orange, unsclerotised part of abdomen uniformly medium yellowish-brown. *Legs*: formula 4123. Patella and tibia I with numerous and dense small ventral granules. True undivided scopula on entire ventral and prolateral surface of tibia I; long, entire and prolateral on metatarsus

Figures 17–20. *Palpimanus paroculus*, female (lectotype), prosoma. **17** Dorsal view **18** ventral view **19** lateral view **20** postero-dorsal view.

and tarsus I, absent elsewhere. Metatarsi II–IV with ventral brushes of dense setae. PTC each with 4–5 tiny low teeth.

Leg measurements:

	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Palp	0.64	0.28	0.38	–	0.65	2.05
I	2.19	1.77	1.48	0.53	0.49	6.46
II	1.54	1.13	1.12	0.80	0.39	4.98
III	1.31	0.93	0.95	0.92	0.43	4.54
IV	1.76	1.19	1.58	1.27	0.70	6.50

Figures 21, 22. *Palpimanus paroculus*, female (lectotype), anterior part prosoma, anterior and dorsal view, respectively. Scale bar: 0.2 mm.

Abdomen: dorsal scutum (*Ds*, Fig. 23) pentagonal, not fused with epigastral one, wider than long (width length ratio 4/3), spaced from epigastral scutum by about 1/8 of maximal width. Epigastral scutum with broad concavity and short petiolar tube (*Pt*) with transversal wrinkles. Postgastral scutum (Fig. 24) long, stripe-like, fused with epigastral one at lateral edges of book-lung slit.

Copulatory organs (Figs 25–29): endogyne weakly sclerotised, with 6 grape-shaped glands (*Gg*) on each side, each gland with long stalk, glands without distinct cilia and pore gland, fine threads indistinct (if present), receptacles (*Re*) sack-like, membranous, without pore glands, laterobasally with one fold (*Rf*).

Male. Unknown.

Types. Lectotype (designated here) ♀, SOUTH AFRICA: *Northern Cape Province*, Komaggas (original "Kammagas"; 29°48'S, 17°30'E), vii.1904, L. Schultze (MNB 14211). Paralectotype: 1♀, collected together with the lectotype (MNB 15210).

Distribution. South Africa (WSC 2019), Namibia (Griffin & Dippenaar-Schoeman 1991).

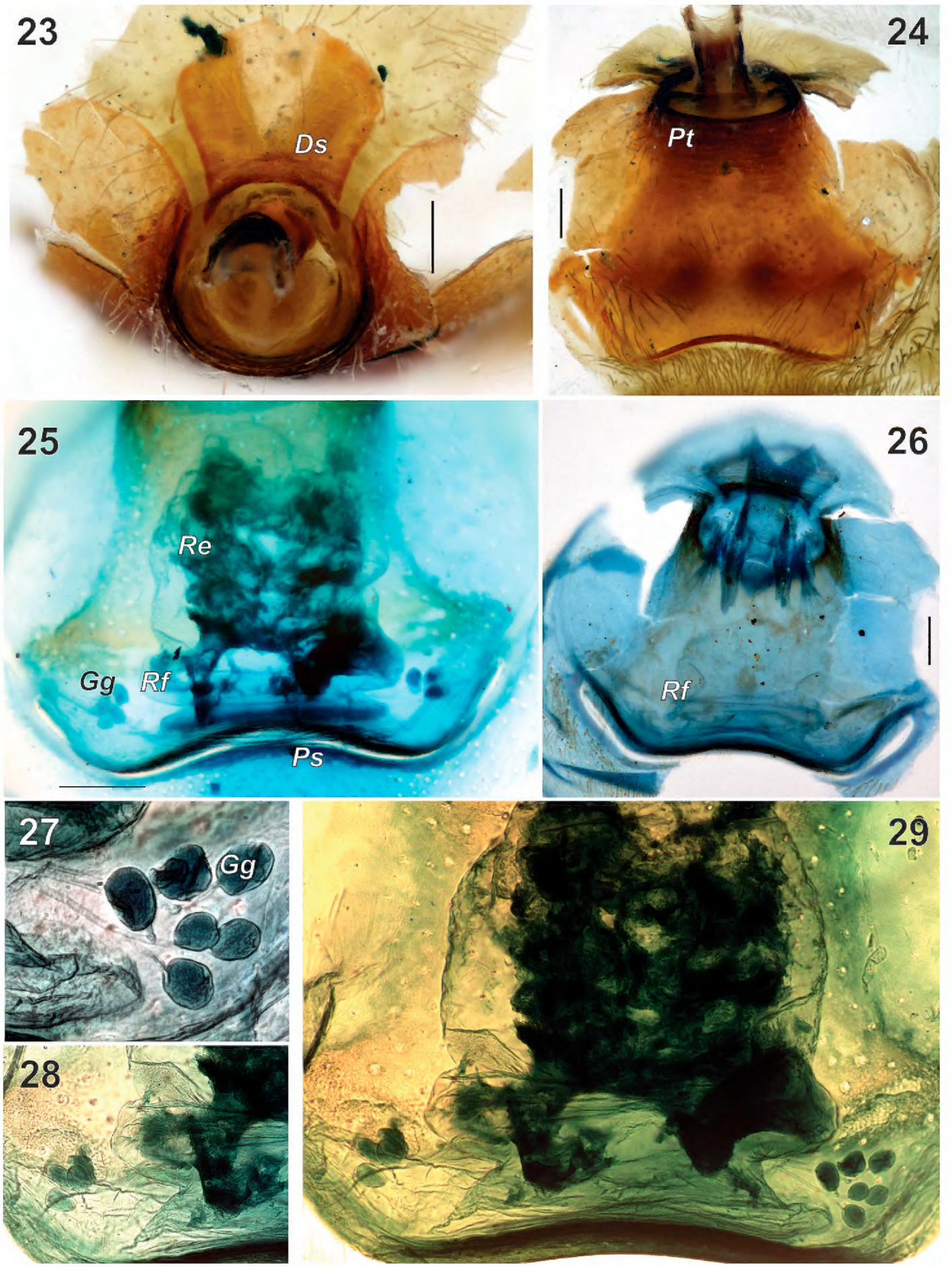
Palpimanus processiger Strand, 1913

Figs 30–37

Palpimanus processiger Strand, 1913: 335 (♂).

Redescription. Male (holotype) MNB 14212.

Habitus (Figs 30–34). Carapace and chelicerae moderately rugose, abdomen covered with moderately dense and uniformly shaped setae. *Measurements*: TL 8.75, CL 3.72, CW 2.83, CyH 0.34, femur I L/W 1.87 (3.27/1.75). *Eyes*: AME 0.27, ALE 0.13, PLE 0.12, PME 0.15, AME–AME 0.10, AME–ALE 0.16, ALE–PLE 0.64, PLE–PME 0.47, PME–PME 0.37. *Colour in alcohol*: Carapace, chelicerae, sternum, labium, palp,



Figures 23–29. *Palpimanus paroculus*, female. **23, 24** Dorsal and epigastral scuta, anterior and ventral view, respectively **25, 26** endogyne (lectotype and paralectotype) **27** right side of endogyne, close up (lectotype) **28** left side of endogyne **29** endogyne, dorsal view. Scale bars: 0.2 mm (where indicated). Abbreviations: *Gg* grape shaped gland; *Ps* postgastral scutum; *Re* receptacle; *Rf* basolateral fold of endogyne.

leg I from coxa to metatarsus and most part of abdominal scuta intense cherry-red, tarsus I and legs II–IV (including coxae) and posterior part of ventral abdominal scutum yellowish-orange, unsclerotised part of abdomen medium yellowish-brown, lighter an-

Figures 30–34. *Palpimanus processiger*, male (holotype). **30, 31** Habitus, dorsal and lateral view, respectively **32, 34** prosoma, ventral and dorsal view, respectively **33** anterior part of prosoma, dorsal view.

teriorly and darker posteriorly and ventrally, with numerous and fairly dense darker brownish muscular pits, more dense on ventral side. *Legs*: formula 1432. Patella and tibia I with numerous and dense small ventral granules, tibia I prolaterally also with numerous flattened mound-shaped granules. True undivided scopula on entire proventral surface of tibia I; long, entire and prolateral on metatarsus I, vestigial and prolateral on tarsus I, vestigial and divided by setae on distal metatarsi and tarsi II–IV. Metatarsi II–IV with ventral brushes of dense setae. PTC each with 2–5 small acute teeth.

Leg measurements:

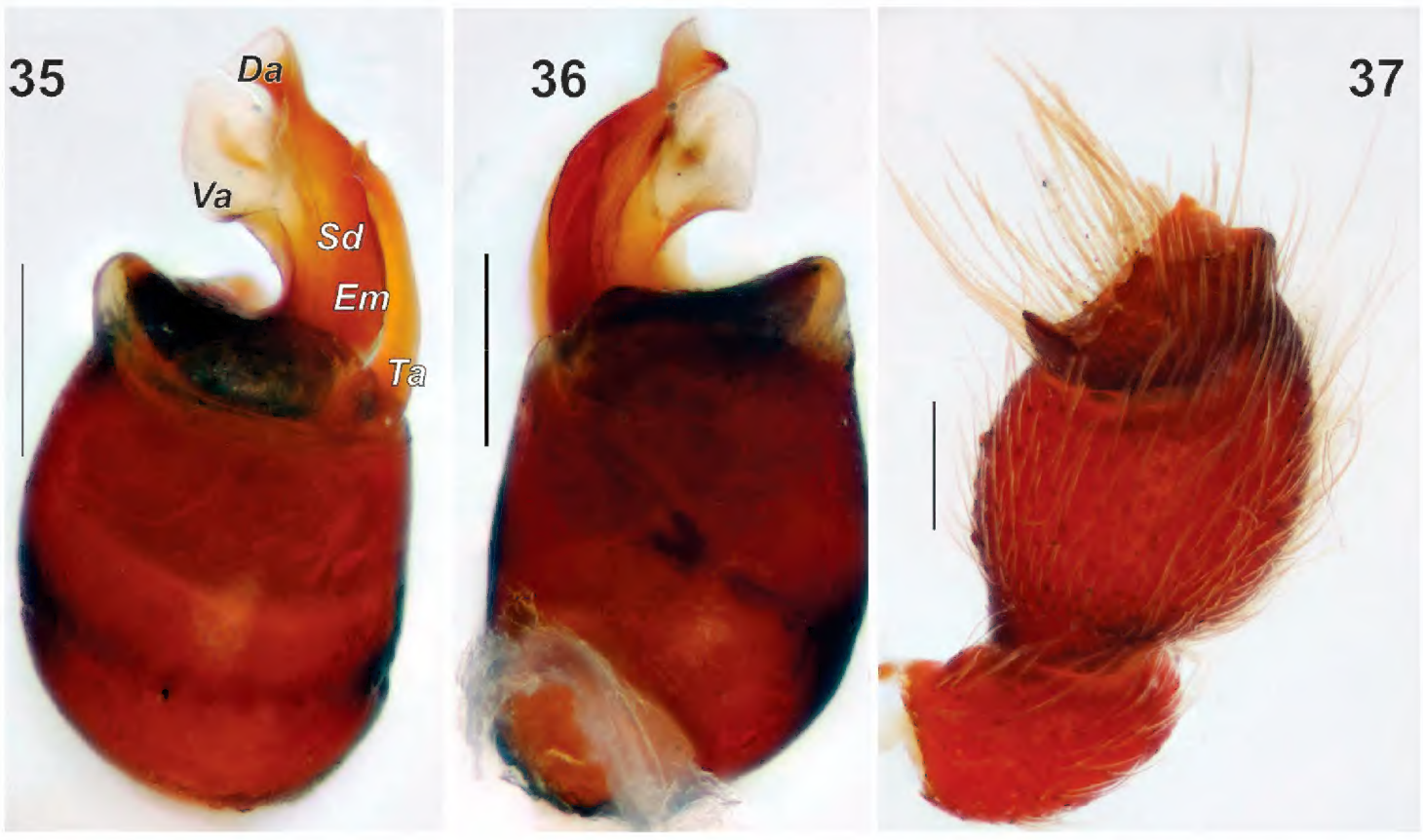
	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Palp	0.97	0.34	0.49	–	0.84	2.64
I	3.27	2.72	1.96	0.83	0.80	9.58
II	2.24	1.53	1.59	1.07	0.76	7.19
III	2.03	1.42	1.49	1.18	0.59	7.61
IV	2.52	1.58	1.97	1.77	0.82	8.66

Copulatory organs (Figs 35–37): Tibia slightly swollen, 1.4 times wider than patella and cymbium, almost as wide as long; cymbium 2 times longer than wide; bulb with tegular part longer than wide; terminal part with 2 distinct processes (plus poorly discernible flattened mound located opposite these two), kind of tegular apophysis (*Ta*) and broad, partly membranous complex embolus (*Em*). Tegular apophysis thin, smoothly bent, at least 7 times longer than wide. Embolus broad, bifurcated near the tip, both arms membranous, dorsal arm (*Da*) smaller than ventral arm (*Va*); sperm duct (*Sd*) of embolus distinct.

Female. Unknown.

Types. Holotype ♂, RWANDA: *Western Province*, Kisenge (original "Kissendji"; 02°14'S, 29°31'E), ix.1907, L. Schultze (MNB 14212).

Distribution. Known only from the type locality (incorrectly associated in catalogues with DR Congo, see: WSC 2019).



Figures 35–37. Male palp of *Palpimanus processiger*, holotype. **35, 36** Bulb, retrolateral and prolateral view, respectively **37** patella, tibia and part of cymbium, retrolateral view. Scale bar: 0.2 mm. Abbreviations: *Da* dorsal arm of embolus; *Em* embolus; *Sd* sperm duct of embolus; *Ta* tegular apophysis; *Va* ventral arm of embolus.

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